

Remarks

I. Status of claims

Claims 1-37 are pending.

II. Claim rejections under 35 U.S.C. § 101

The Examiner has rejected claim 32 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Claim 32 has been amended in accordance with the Examiner's suggestion. For at least this reason, the rejection of claim 32 under 35 U.S.C. § 101 now should be withdrawn.

III. Claim rejections under 35 U.S.C. § 102

A. Introduction

The Examiner has rejected claims 1, 3-18, 20-33, and 35-37 under 35 U.S.C. § 102(b) over Lubin (U.S. 6,285,797).

B. Applicable standards for sustaining a rejection under 35 U.S.C. § 102(b)

The relevant part of 35 U.S.C. § 102(b) recites that "A person shall be entitled to an invention, unless - ... the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States." Anticipation under 35 U.S.C. § 102(b) requires that each and every element of the claimed invention be present, either expressly or inherently, in a single prior art reference. EMI Group N. Am., Inc., v. Cypress Semiconductor Corp., 268 F.3d 1342, 1350 (Fed. Cir. 2001). Anticipation must be proved by clear and convincing evidence. Electro Medical Systems, S.A. v. Cooper Life Sciences, Inc., 34 F3d 1048, 1052 (Fed. Cir. 1994).

C. Independent claim 1

Independent claim 1 has been amended and now recites:

Claim 1 (currently amended): A method of assessing image quality, comprising:

detecting a target object region in an input image, wherein the detecting is performed on image data derived solely from the input image without regard to image data derived from any image other than the input image;

generating an image quality feature vector representing the target object region in an image quality feature space, wherein the generating comprises generating the image quality feature vector from image data derived solely from the input image without regard to image data derived from any image other than the input image; and

mapping the image quality feature vector to a measure of image quality.

As explained in detail below, the rejection of independent claim 1 under 35 U.S.C. § 102(b) over Lubin should be withdrawn because Lubin neither expressly nor inherently discloses each and every element of the invention defined by the claim.

Lubin discloses a system for estimating digital video quality that includes a vision preprocessor, a virtual reference generator, a virtual distortion generator, and an image quality metric generator.

The vision preprocessor produces a vision-like transformation of an input video sequence to produce a vision energy map (VEM) (see col. 1, lines 51-54). “[T]his transformation captures moving-edge responses as well as responses to stationary edges and flickering fields” (col. 3, lines 47-49; emphasis added). The outputs of the vision preprocessor are “local, psychophysically weighted space-time contrasts” (see col. 3, lines 56-57; emphasis added). Thus, each of the VEMs is computed based on an analysis of multiple frames of the video stream.

The virtual reference generator produces from the VEMs a virtual reference, which characterizes likely signal components within the video sequence (see col. 2, lines 20-22 and 35-37). The virtual reference generator produces the virtual reference based on “...an optic flow

calculation, in which video features determined to represent specific signal components (e.g., moving edges) are tracked across frames of video” (col. 2, lines 57-59). Thus, the virtual reference is computed based on an analysis of multiple frames of the video stream. Indeed, in accordance with Lubin’s disclosure (col. 4, lines 50-55; emphasis added):

... Well-known pyramid-based (multiresolution) optic flow calculations are used to cluster VMLs over time and space. This clustering allows the likely signal to be extracted by averaging across the VMLs in the cluster. This averaging process is used to extract a virtual reference, against which the perceptibility of various distortions can be assessed.

The virtual distortion generator produces from the VEMs a virtual distortion that provides “...quantitative estimates of the likely locations and physical magnitudes of ‘noise’; i.e., distortions of the video stream introduced by encoding, transmission, or other causes” (col. 2, lines 39-42). The distortion estimation process includes a scintillation detection process that involves identifying moving edges and determining likely artifacts near moving edges (see col. 5, lines 12-13 and 25-30). Thus, the virtual distortion is computed based on an analysis of multiple frames of the video stream.

The image quality metric generator produces an image quality metric for an input video sequence based on the virtual reference and the virtual distortion. In this process, the virtual distortion is added to the virtual reference to produce a virtual test (see col. 6, line 12). The image quality metric generator implements a just noticeable differences (JND) process that performs area based comparisons between the virtual reference and the virtual test (see col. 2, lines 42-55). The JND process involves processing each of the virtual reference and the virtual test through respective in-channel masking stages 328A and 328B and respective cross-channel masking stages 330A and 330B. The resulting signals (VEMs) are compared by a perceptual distortion metric to produce an estimated quality rating (see col. 7, lines 11-13).

In support of the rejection of claim 1, the Examiner has taken the position that the virtual reference generator 302 performs target object detection. In this regard, the Examiner has stated that “the signal and distortion estimation generators detect target object regions relating to a video signal or distortion.” As explained above, however, the virtual reference generator produces the virtual reference from an analysis of multiple frames of the input video stream.

Therefore, the virtual reference generator 302 does not perform “detecting a target object region in an input image, wherein the detecting is performed on image data derived solely from the input image without regard to image data derived from any image other than the input image,” as now recited in claim 1.

The Examiner also has taken the position that the adder 326 performs image quality feature vector generation. In this regard, the Examiner has stated that “the virtual test is a combination of the feature vectors for target object regions determined in the signal and distortion estimation generator.” As explained above, however, both the virtual reference and the virtual test are produced based on respective analyses of multiple frames of the input video stream. Therefore, neither the virtual reference generator nor the virtual distortion generator nor the adder 326, taken alone or in any permissible combination, performs “generating an image quality feature vector representing the target object region in an image quality feature space, wherein the generating comprises generating the image quality feature vector from image data derived solely from the input image without regard to image data derived from any image other than the input image,” as now recited in claim 1.

For at least the reasons explained above, the rejection of independent claim 1 under 35 U.S.C. § 102(b) over Lubin now should be withdrawn.

D. Claims 3-17

Each of claims 3-17 incorporates the elements of independent claim 1 and therefore is patentable over Lubin for at least the same reasons explained above.

E. Independent claim 18

Independent claim 18 recites elements that essentially track the pertinent elements of independent claim 1 discussed above. Therefore independent claim 18 is patentable over Lubin for at least the same reasons explained above in connection with independent claim 1.

F. Claims 20-30 and 37

Each of claims 20-30 and 37 incorporates the elements of independent claim 18 and therefore is patentable over Lubin for at least the same reasons explained above.

G. Independent claim 31

Independent claim 31 recites elements that essentially track the pertinent elements of independent claim 1 discussed above. Therefore independent claim 31 is patentable over Lubin for at least the same reasons explained above in connection with independent claim 1.

H. Independent claim 32

Independent claim 32 recites elements that essentially track the pertinent elements of independent claim 1 discussed above. Therefore independent claim 32 is patentable over Lubin for at least the same reasons explained above in connection with independent claim 1.

I. Independent claim 33

Independent claim 33 recites elements that essentially track the pertinent elements of independent claim 1 discussed above. Therefore independent claim 33 is patentable over Lubin for at least the same reasons explained above in connection with independent claim 1.

J. Claims 35-36

Each of claims 35-36 incorporates the elements of independent claim 33 and therefore is patentable over Lubin for at least the same reasons explained above.

IV. Claim rejections under 35 U.S.C § 103

A. Introduction

The Examiner has rejected claims 2, 19, and 34 under 35 U.S.C § 103(a) over Lubin.

B. Applicable standards for sustaining a rejection under 35 U.S.C. § 103(a)

“A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. §103(a).

In an appeal involving a rejection under 35 U.S.C. § 103, an examiner bears the initial burden of establishing *prima facie* obviousness. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). To support a *prima facie* conclusion of obviousness, the prior art must disclose or suggest all the limitations of the claimed invention.¹ See In re Lowry, 32 F.3d 1579, 1582, 32 USPQ2d 1 031, 1034 (Fed. Cir. 1994). If the examiner has established a *prima facie* case of obviousness, the burden of going forward then shifts to the applicant to overcome the *prima facie* case with argument and/or evidence. Obviousness, is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. This inquiry requires (a) determining the scope and contents of the prior art; (b) ascertaining the differences between the prior art and the claims in issue; (c) resolving the level of ordinary skill in the pertinent art; and (d) evaluating evidence of secondary consideration. See KSR Int'l Co. v. Teleflex Inc., No. 04-1350, slip op. at 2 (U.S. Apr. 30, 2007) (citing Graham v. John Deere, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966)). If all claim limitations are found in a number of prior art references, the fact finder must determine whether there was an apparent reason to combine the known elements in the fashion claimed. See KSR, slip op. at 14. This analysis should be made explicit. KSR, slip op at 14 (citing In re Kahn, 441 F. 3d 977, 988 (CA Fed. 2006): “[R]ejections on obviousness grounds cannot be sustained by mere conclusory

¹ The U.S. Patent and Trademark Office has set forth the following definition of the requirements for establishing a *prima facie* case of unpatentability (37 CFR § 1.56(b)(ii):

A *prima facie* case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”).

C. Dependent claim 2

Claim 2 depends from independent claim 1. Lubin does not disclose or suggest the elements of independent claim 1 discussed above. Therefore, claim 2 is patentable over Lubin for at least the same reasons explained above in connection with independent claim 1.

Claim 2 also is patentable over Lubin for the following additional reason.

The sole reason given by the Examiner in support of the rejection of claim 2 under 35 U.S.C. § 103(a) over Lubin is as follows (see page 9, § 9 of the Office action; emphasis added):

As to claims 2, Lubin discloses the method of claim 1, however, does not explicitly disclose wherein the target object region corresponds to a human face. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the method disclosed by Lubin with a target object region that corresponds to a human face. Therefore the Examiner takes Official Notice that the target object region disclosed by Lubin could have easily been a human face, as claimed.

The Examiner has not explained any apparent reason why one skilled in the art would have been motivated to modify Lubin's disclosure in the manner proposed by the Examiner. Instead, without citing any support from either Lubin or the knowledge generally available at the time the invention was made, the Examiner simply stated his conclusion that “It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the method disclosed by Lubin with a target object region that corresponds to a human face.” This rationale, however, amounts to no more than a conclusory statement that does not have any rational underpinning that supports a rejection under 35 U.S.C. § 103. See *KSR Int'l Co. v. Teleflex Inc.*, No. 04-1350, slip op. at 14 (U.S. Apr. 30, 2007) (citing *In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006): “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”).

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For at least this additional reason, the rejection of claim 2 under 35 U.S.C. § 103(a) over Lubin should be withdrawn.

D. Dependent claim 19

Claim 19 depends from independent claim 18. Lubin does not disclose or suggest the elements of independent claim 18 discussed above. Therefore, claim 19 is patentable over Lubin for at least the same reasons explained above in connection with independent claim 18.

Claim 19 also is patentable over Lubin for the additional reason explained above in connection with dependent claim 2.

E. Dependent claim 34

Claim 34 depends from independent claim 33. Lubin does not disclose or suggest the elements of independent claim 33 discussed above. Therefore, claim 34 is patentable over Lubin for at least the same reasons explained above in connection with independent claim 33.

Claim 34 also is patentable over Lubin for the additional reason explained above in connection with dependent claim 2.

V. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

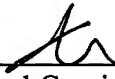
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